

We claim:

1 1. Lubricants for drilling fluid systems comprising a dispersion
2 comprising at least one fatty acid soap comprising at least one alkali metal having a
3 valence of 1, said fatty acid soap being dispersed in a carrier fluid.

1 2. The lubricants of claim 1 wherein said alkali metal is selected from the
2 group consisting of lithium, sodium, potassium, rubidium, cesium, and combinations
3 thereof.

1 3. The lubricants of claim 1 wherein said alkali metal are selected from
2 the group consisting of lithium, sodium, potassium, and combinations thereof.

1 4. The lubricants of claim 1 wherein said fatty acid soap comprises
2 monocarboxylic acid selected from the group consisting of saturated monocarboxylic
3 acids and unsaturated monocarboxylic acids having the following general structure:

4 R-COOH

5 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
6 having from about 10 to about 28 carbon atoms, said alkenyl groups comprising from
7 about 0 to about 4 unsaturated carbon-carbon bonds.

1 5. The lubricants of claim 2 wherein said fatty acid soap comprises
2 monocarboxylic acid selected from the group consisting of saturated monocarboxylic
3 acids and unsaturated monocarboxylic acids having the following general structure:

4 R-COOH

5 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
6 having from about 10 to about 28 carbon atoms, said alkenyl groups comprising from
7 about 0 to about 4 unsaturated carbon-carbon bonds.

1 6. The lubricants of claim 3 wherein said fatty acid soap comprises

2 monocarboxylic acid selected from the group consisting of saturated monocarboxylic
3 acids and unsaturated monocarboxylic acids having the following general structure:

4 R-COOH

5 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
6 having from about 10 to about 28 carbon atoms, said alkenyl groups comprising from
7 about 0 to about 4 unsaturated carbon-carbon bonds.

1 7. The lubricants of claim 1 wherein said fatty acid soap comprises
2 monocarboxylic acid selected from the group consisting of saturated monocarboxylic
3 acid and unsaturated monocarboxylic acid having the following general structure:

4 R-COOH

5 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
6 having from about 16 to about 24 carbon atoms, and said alkyl groups comprise from
7 about 0 to about 2 unsaturated carbon-carbon bonds.

1 8. The lubricants of claim 2 wherein said fatty acid soap comprises
2 monocarboxylic acid selected from the group consisting of saturated monocarboxylic
3 acid and unsaturated monocarboxylic acid having the following general structure:

4 R-COOH

5 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
6 having from about 16 to about 24 carbon atoms, and said alkyl groups comprise from
7 about 0 to about 2 unsaturated carbon-carbon bonds.

1 9. The lubricants of claim 3 wherein said fatty acid soap comprises
2 monocarboxylic acid selected from the group consisting of saturated monocarboxylic
3 acid and unsaturated monocarboxylic acid having the following general structure:

4 R-COOH

5 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
6 having from about 16 to about 24 carbon atoms, and said alkyl groups comprise from
7 about 0 to about 2 unsaturated carbon-carbon bonds.

1 10. The lubricants of claim 1 wherein said fatty acid is derived from a
2 material selected from the group consisting of animal fats and vegetable fats.

1 11. The lubricants of claim 2 wherein said fatty acid is derived from a
2 material selected from the group consisting of animal fats and vegetable fats.

1 12. The lubricants of claim 3 wherein said fatty acid is derived from a
2 material selected from the group consisting of animal fats and vegetable fats.

1 13. The lubricants of claim 1 wherein said fatty acid soap comprises a fatty
2 acid selected from the group consisting of tall oil fatty acids, stearic acids, palmitic
3 acids, myristic acids, oleic acids, and fatty acids derived from castor oil, coconut oil,
4 cotton-seed oil, rice oil, soybean oil, lard oil, rosin acids, tall oils, and combinations
5 thereof.

1 14. The lubricants of claim 2 wherein said fatty acid soap comprises a fatty
2 acid selected from the group consisting of tall oil fatty acids, stearic acids, myristic
3 acids, palmitic acids, oleic acids, and fatty acids derived from castor oil, coconut oil,
4 cotton-seed oil, rice oil, soybean oil, lard oil, rosin acids, tall oils, and combinations
5 thereof.

1 15. The lubricants of claim 3 wherein said fatty acid soap comprises a fatty
2 acid selected from the group consisting of tall oil fatty acids, stearic acids, palmitic
3 acids, myristic acids, oleic acids, and fatty acids derived from castor oil, coconut oil,
4 cotton-seed oil, rice oil, soybean oil, lard oil, rosin acids, tall oils, and combinations
5 thereof.

1 16. The lubricants of claim 1 wherein said fatty acid of said fatty acid soap
2 is selected from the group consisting of stearic acid, palmitic acid, and myristic acids.

1 17. The lubricants of claim 2 wherein said fatty acid of said fatty acid soap
2 is selected from the group consisting of stearic acid, palmitic acid, and myristic acids.

1 18. The lubricants of claim 3 wherein said fatty acid of said fatty acid soap
2 is selected from the group consisting of stearic acid, palmitic acid, and myristic acids.

1 19. The lubricants of claim 1 wherein said carrier comprises one or more
2 glycols.

1 20. The lubricants of claim 18 wherein said carrier comprises one or more
2 glycols.

1 21. The lubricants of claim 1 wherein said carrier comprises one or more
2 water soluble glycol ether.

1 22. The lubricants of claim 2 wherein said carrier comprises one or more
2 water soluble glycol ether.

1 23. The lubricants of claim 3 wherein said carrier comprises one or more
2 water soluble glycol ether.

1 24. The lubricants of claim 18 wherein said carrier comprises one or more
2 water soluble glycol ether.

1 25. The lubricants of claim 21 wherein said water soluble glycol ether is
2 selected from the group consisting of propylene glycol ethers, polyethylene glycol
3 ethers and polypropylene glycol ethers having a number average molecular weight of
4 about 2000 or less, and combinations thereof.

1 26. The lubricants of claim 25 wherein said number average molecular
2 weight is about 1000 or less.

1 27. The lubricants of claim 22 wherein said water soluble glycol ether is
2 selected from the group consisting of propylene glycol ethers, polyethylene glycol
3 ethers and polypropylene glycol ethers having a number average molecular weight of
4 about 2000 or less, and combinations thereof.

1 28. The lubricants of claim 27 wherein said number average molecular
2 weight is about 1000 or less.

1 29. The lubricants of claim 23 wherein said water soluble glycol ether is
2 selected from the group consisting of propylene glycol ethers, polyethylene glycol
3 ethers and polypropylene glycol ethers having a number average molecular weight of
4 about 2000 or less, and combinations thereof.

1 30. The lubricants of claim 29 wherein said number average molecular
2 weight is about 1000 or less.

1 31. The lubricants of claim 24 wherein said water soluble glycol ether is
2 selected from the group consisting of propylene glycol ethers, polyethylene glycol
3 ethers and polypropylene glycol ethers having a number average molecular weight of
4 about 2000 or less, and combinations thereof.

1 32. The lubricants of claim 31 wherein said number average molecular
2 weight is about 1000 or less.

1 33. Lubricants for drilling fluid systems comprising a dispersion
2 comprising at least one fatty acid soap comprising lithium, said fatty acid soap being
3 dispersed in a carrier fluid.

1 34. The lubricants of claim 33 wherein said fatty acid soap comprises
2 monocarboxylic acid selected from the group consisting of saturated monocarboxylic
3 acids and unsaturated monocarboxylic acids having the following general structure:

4 R-COOH

5 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
6 having from about 10 to about 28 carbon atoms, said alkenyl groups comprising from
7 about 0 to about 4 unsaturated carbon-carbon bonds.

1 35. The lubricants of claim 33 wherein said fatty acid soap comprises
2 monocarboxylic acid selected from the group consisting of saturated monocarboxylic
3 acid and unsaturated monocarboxylic acid having the following general structure:

4 R-COOH

5 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
6 having from about 16 to about 24 carbon atoms, and said alkyl groups comprise from
7 about 0 to about 2 unsaturated carbon-carbon bonds.

1 36. The lubricants of claim 33 wherein said fatty acid soap comprises fatty
2 acid derived from a material selected from the group consisting of animal fats and
3 vegetable fats.

1 37. The lubricants of claim 33 wherein said fatty acid soap comprises a
2 fatty acid selected from the group consisting of tall oil fatty acids, stearic acids,
3 palmitic acids, oleic acids, and fatty acids derived from castor oil, coconut oil, cotton-
4 seed oil, rice oil, soybean oil, lard oil, rosin acids, tall oils, and combinations thereof.

1 38. The lubricants of claim 33 wherein said fatty acid of said fatty acid
2 soap is selected from the group consisting of stearic acid, palmitic acid, and myristic
3 acid.

1 39. The lubricants of claim 33 wherein said carrier comprises one or more
2 glycols.

1 40. The lubricants of claim 38 wherein said carrier comprises one or more

2 glycols.

1 41. The lubricants of claim 33 wherein said carrier comprises one or more
2 water soluble glycol ether.

1 42. The lubricants of claim 41 wherein said water soluble glycol ether is
2 selected from the group consisting of propylene glycol ethers, polyethylene glycol
3 ethers and polypropylene glycol ethers having a number average molecular weight of
4 about 2000 or less, and combinations thereof.

1 43. The lubricants of claim 42 wherein said number average molecular
2 weight is about 1000 or less.

1 44. The lubricants of claim 38 wherein said carrier comprises one or more
2 water soluble glycol ether.

1 45. The lubricants of claim 44 wherein said water soluble glycol ether is
2 selected from the group consisting of propylene glycol ethers, polyethylene glycol
3 ethers and polypropylene glycol ethers having a number average molecular weight of
4 about 2000 or less, and combinations thereof.

1 46. The lubricants of claim 45 wherein said number average molecular
2 weight is about 1000 or less.

1 47. Lubricants for drilling fluid systems comprising a dispersion
2 comprising at least one alkali metal having a valence of 1 and stearate dispersed in a
3 carrier fluid.

1 48. The lubricants of claim 47 wherein said alkali metal is selected from
2 the group consisting of lithium, sodium, potassium, rubidium, cesium, and
3 combinations thereof.

1 49. The lubricants of claim 47 wherein said alkali metal are selected from

2 the group consisting of lithium, sodium, potassium, and combinations thereof.

1 50. The lubricants of claim 47 wherein said carrier comprises one or more
2 glycols.

1 51. The lubricants of claim 49 wherein said carrier comprises one or more
2 glycols.

1 52. The lubricants of claim 47 wherein said carrier comprises one or more
2 water soluble glycol ether.

1 53. The lubricants of claim 52 wherein said water soluble glycol ether is
2 selected from the group consisting of propylene glycol ethers, polyethylene glycol
3 ethers and polypropylene glycol ethers having a number average molecular weight of
4 about 2000 or less, and combinations thereof.

1 54. The lubricants of claim 53 wherein said number average molecular
2 weight is about 1000 or less.

1 55. The lubricants of claim 49 wherein said carrier comprises one or more
2 water soluble glycol ether.

1 56. The lubricants of claim 55 wherein said water soluble glycol ether is
2 selected from the group consisting of propylene glycol ethers, polyethylene glycol
3 ethers and polypropylene glycol ethers having a number average molecular weight of
4 about 2000 or less, and combinations thereof.

1 57. The lubricants of claim 56 wherein said number average molecular
2 weight is about 1000 or less.

1 58. Lubricants for drilling fluid systems comprising a dispersion
2 comprising lithium stearate dispersed in a carrier fluid.

1 59. The lubricants of claim 58 wherein said carrier comprises one or more

2 glycols.

1 60. The lubricants of claim 58 wherein said carrier comprises one or more
2 water soluble glycol ether.

1 61. The lubricants of claim 60 wherein said water soluble glycol ether is
2 selected from the group consisting of propylene glycol ethers, polyethylene glycol
3 ethers and polypropylene glycol ethers having a number average molecular weight of
4 about 2000 or less, and combinations thereof.

1 62. The lubricants of claim 61 wherein said number average molecular
2 weight is about 1000 or less.

1 63. A drilling fluid system comprising a dispersion comprising at least one
2 fatty acid soap comprising at least one alkali metal having a valence of 1, said fatty
3 acid soap being dispersed in a continuous phase of said drilling fluid system in a
4 quantity effective to form a coherent lubricating film on metal surfaces exposed to
5 said dispersion.

1 64. The drilling fluid system of claim 63 wherein said alkali metal is
2 selected from the group consisting of lithium, sodium, potassium, rubidium, cesium,
3 and combinations thereof.

1 65. The drilling fluid system of claim 63 wherein said alkali metal are
2 selected from the group consisting of lithium, sodium, potassium, and combinations
3 thereof.

1 66. The drilling fluid system of claim 63 wherein said fatty acid soap
2 comprises monocarboxylic acid selected from the group consisting of saturated
3 monocarboxylic acids and unsaturated monocarboxylic acids having the following
4 general structure:

5 R-COOH

6 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
7 having from about 10 to about 28 carbon atoms, said alkenyl groups comprising from
8 about 0 to about 4 unsaturated carbon-carbon bonds.

1 67. The drilling fluid system of claim 63 wherein said fatty acid soap
2 comprises monocarboxylic acid selected from the group consisting of saturated
3 monocarboxylic acid and unsaturated monocarboxylic acid having the following
4 general structure:

5 R-COOH

6 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
7 having from about 16 to about 24 carbon atoms, and said alkyl groups comprise from
8 about 0 to about 2 unsaturated carbon-carbon bonds.

1 68. The drilling fluid system of claim 63 wherein said fatty acid soap
2 comprises fatty acid derived from a material selected from the group consisting of
3 animal fats and vegetable fats.

1 69. The drilling fluid system of claim 63 wherein said fatty acid soap
2 comprises a fatty acid selected from the group consisting of tall oil fatty acids, stearic
3 acids, palmitic acids, oleic acids, and fatty acids derived from castor oil, coconut oil,
4 cotton-seed oil, rice oil, soybean oil, lard oil, rosin acids, tall oils, and combinations
5 thereof.

1 70. The drilling fluid system of claim 63 wherein said fatty acid soap
2 comprises a fatty acid selected from the group consisting of stearic acid, palmitic acid,
3 and myristic acid.

1 71. The drilling fluid system of claim 63 wherein said quantity is from

2 about 0.01 to about 10 vol.% of said drilling fluid system.

1 72. The drilling fluid system of claim 63 wherein said quantity is from
2 about 2 to about 5 vol.%.

1 73. The drilling fluid system of claim 70 wherein said quantity is from
2 about 0.01 to about 10 vol.% of said drilling fluid system.

1 74. The drilling fluid system of claim 70 wherein said quantity is from
2 about 2 to about 5 vol.%.

1 75. The drilling fluid system of claim 63 comprising one or more
2 monomers comprising acrylamide.

1 76. The drilling fluid system of claim 75 where said one or more
2 monomers comprising acrylamide comprise a combination of acrylamide alkyl alkane
3 sulfonate(s) and dialkyl acrylamides, and combinations thereof.

1 77. The drilling fluid system of claim 75 wherein said one or more
2 monomers comprising acrylamide comprise a combination of acrylamide methyl
3 propane sulfonate (AMPS), dimethyl acryamide (DMA), and combination thereof.

1 78. The drilling fluid system of claim 75 comprising a combination of
2 acrylamide methyl propane sulfonate (AMPS) and dimethyl acryamide (DMA).

1 79. A drilling fluid system comprising a dispersion comprising at least one
2 fatty acid soap comprising lithium, said fatty acid soap being dispersed in a
3 continuous phase of said fluid system in a quantity effective to form a coherent
4 lubricating film on metal surfaces exposed to said dispersion.

1 80. The drilling fluid system of claim 79 wherein said fatty acid soap
2 comprises monocarboxylic acid selected from the group consisting of saturated
3 monocarboxylic acids and unsaturated monocarboxylic acids having the following

4 general structure:

5 R-COOH

6 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
7 having from about 10 to about 28 carbon atoms, said alkenyl groups comprising from
8 about 0 to about 4 unsaturated carbon-carbon bonds.

1 81. The drilling fluid system of claim 79 wherein said fatty acid soap
2 comprises monocarboxylic acid selected from the group consisting of saturated
3 monocarboxylic acid and unsaturated monocarboxylic acid having the following
4 general structure:

5 R-COOH

6 wherein R is selected from the group consisting of alkyl groups and alkenyl groups
7 having from about 16 to about 24 carbon atoms, and said alkyl groups comprise from
8 about 0 to about 2 unsaturated carbon-carbon bonds.

1 82. The drilling fluid system of claim 79 wherein said fatty acid soap
2 comprises fatty acid derived from a material selected from the group consisting of
3 animal fats and vegetable fats.

1 83. The drilling fluid system of claim 79 wherein said fatty acid soap
2 comprises a fatty acid selected from the group consisting of tall oil fatty acids, stearic
3 acids, palmitic acids, oleic acids, and fatty acids derived from castor oil, coconut oil,
4 cotton-seed oil, rice oil, soybean oil, lard oil, rosin acids, tall oils, and combinations
5 thereof.

1 84. The drilling fluid system of claim 79 wherein said fatty acid soap
2 comprises a fatty acid selected from the group consisting of stearic acid, palmitic acid,
3 and myristic acid.

1 85. The drilling fluid system of claim 79 wherein said quantity is from
2 about 0.01 to about 10 vol.% of said drilling fluid system.

1 86. The drilling fluid system of claim 79 wherein said quantity is from
2 about 2 to about 5 vol.%.

1 87. The drilling fluid system of claim 84 wherein said quantity is from
2 about 0.01 to about 10 vol.% of said drilling fluid system.

1 88. The drilling fluid system of claim 84 wherein said quantity is from
2 about 2 to about 5 vol.%.

1 89. The drilling fluid system of claim 79 comprising one or more
2 monomers comprising acrylamide.

1 90. The drilling fluid system of claim 89 where said one or more
2 monomers comprising acrylamide comprise a combination of acrylamide alkyl alkane
3 sulfonate(s) and dialkyl acrylamides, and combinations thereof.

1 91. The drilling fluid system of claim 89 wherein said one or more
2 monomers comprising acrylamide comprise a combination of acrylamide methyl
3 propane sulfonate (AMPS), dimethyl acryamide (DMA), and combinations thereof.

1 92. The drilling fluid system of claim 89 comprising a combination of
2 acrylamide methyl propane sulfonate (AMPS) and dimethyl acryamide (DMA).

1 93. The drilling fluid system of claim 84 comprising one or more
2 monomers comprising acrylamide.

1 94. The drilling fluid system of claim 93 where said one or more
2 monomers comprising acrylamide comprise a combination of acrylamide alkyl alkane
3 sulfonate(s) and dialkyl acrylamides, and combinations thereof.

1 95. The drilling fluid system of claim 93 wherein said one or more

2 monomers comprising acrylamide comprise a combination of acrylamide methyl
3 propane sulfonate (AMPS), dimethyl acryamide (DMA), and combinations thereof.

1 96. The drilling fluid system of claim 93 comprising a combination of
2 acrylamide methyl propane sulfonate (AMPS) and dimethyl acryamide (DMA).

1 97. A drilling fluid system comprising a dispersion comprising at least one
2 fatty acid soap comprising stearate and at least one alkali metal having a valence of 1,
3 said fatty acid soap being dispersed in a continuous phase of said drilling fluid system
4 in a quantity effective to form a coherent lubricating film on metal surfaces exposed
5 to said dispersion.

1 98. The drilling fluid system of claim 97 wherein said alkali metal is
2 selected from the group consisting of lithium, sodium, potassium, rubidium, cesium,
3 and combinations thereof.

1 99. The drilling fluid system of claim 97 wherein said alkali metal are
2 selected from the group consisting of lithium, sodium, potassium, and combinations
3 thereof.

1 100. The drilling fluid system of claim 97 wherein said quantity is from
2 about 0.01 to about 10 vol.% of said drilling fluid system.

1 101. The drilling fluid system of claim 97 wherein said quantity is from
2 about 2 to about 5 vol.%.

1 102. The drilling fluid system of claim 99 wherein said quantity is from
2 about 0.01 to about 10 vol.% of said drilling fluid system.

1 103. The drilling fluid system of claim 99 wherein said quantity is from
2 about 2 to about 5 vol.%.

1 104. The drilling fluid system of claim 97 comprising one or more

2 monomers comprising acrylamide.

1 105. The drilling fluid system of claim 104 comprising one or more
2 monomers comprising acrylamide comprise a combination of acrylamide alkyl alkane
3 sulfonate(s) and dialkyl acrylamides, and combinations thereof.

1 106. The drilling fluid system of claim 104 comprising said one or more
2 monomers comprising acrylamide comprise a combination of acrylamide methyl
3 propane sulfonate (AMPS), dimethyl acryamide (DMA), and combinations thereof.

1 107. The drilling fluid system of claim 104 comprising a combination of
2 acrylamide methyl propane sulfonate (AMPS) and dimethyl acryamide (DMA).

1 108. The drilling fluid system of claim 104 comprising one or more
2 monomers comprising acrylamide comprise a combination of acrylamide alkyl alkane
3 sulfonate(s) and dialkyl acrylamides, and combinations thereof.

1 109. The drilling fluid system of claim 104 wherein said one or more
2 monomers comprising acrylamide comprise a combination of acrylamide methyl
3 propane sulfonate (AMPS), dimethyl acryamide (DMA), and combinations thereof.

1 110. The drilling fluid system of claim 104 comprising a combination of
2 acrylamide methyl propane sulfonate (AMPS) and dimethyl acryamide (DMA).

1 111. A drilling fluid system comprising a dispersion comprising lithium
2 stearate dispersed in a continuous phase of said drilling fluid system in a quantity
3 effective to form a coherent lubricating film on metal surfaces exposed to said
4 dispersion.

1 112. The drilling fluid system of claim 111 wherein said quantity is from
2 about 0.01 to about 10 vol.% of said drilling fluid system.

1 113. The drilling fluid system of claim 111 wherein said quantity is from

2 about 2 to about 5 vol.%.

1 114. The drilling fluid system of claim 111 comprising one or more
2 monomers comprising acrylamide.

1 115. The drilling fluid system of claim 114 comprising one or more
2 monomers comprising acrylamide comprise a combination of acrylamide alkyl alkane
3 sulfonate(s) and dialkyl acrylamides, and combinations thereof.

1 116. The drilling fluid system of claim 114 comprising said one or more
2 monomers comprising acrylamide comprise a combination of acrylamide methyl
3 propane sulfonate (AMPS), dimethyl acryamide (DMA), and combinations thereof.

1 117. The drilling fluid system of claim 114 comprising a combination of
2 acrylamide methyl propane sulfonate (AMPS) and dimethyl acryamide (DMA).

1 118. The drilling fluid system of claim 114 comprising one or more
2 monomers comprising acrylamide comprise a combination of acrylamide alkyl alkane
3 sulfonate(s) and dialkyl acrylamides, and combinations thereof.

1 119. The drilling fluid system of claim 114 wherein said one or more
2 monomers comprising acrylamide comprise a combination of acrylamide methyl
3 propane sulfonate (AMPS), dimethyl acryamide (DMA), and combinations thereof.

1 120. The drilling fluid system of claim 114 comprising a combination of
2 acrylamide methyl propane sulfonate (AMPS) and dimethyl acryamide (DMA).

1 121. A method for prolonging life of drilling equipment comprising
2 exposing at least one metal surface of said drilling equipment to a dispersion
3 comprising a quantity of at least one fatty acid soap comprising at least one alkali
4 metal, said fatty acid soap being dispersed in a continuous phase of said fluid system,
5 said quantity being effective to produce a coherent lubricating film on said metal

6 surface.

1 122. The method of claim 121 wherein said fatty acid soap is lithium
2 stearate.